

REMARKS

I. Introduction

Claims 1-31 are pending in the application.

Claim 23 has been amended to correct grammar. Claims 28-31 have been added.

Support for new claims 28-31 may be found throughout the specification including, particularly, paragraph 32.

The Examiner has rejected claims 1-6, 14, and 17-21 under 35 U.S.C. § 112, first paragraph and claims 1-27 under 35 U.S.C. § 103(a) for the specific reasons noted in detail below.

Applicants traverse the Examiner's rejection of claims 1-27 based on 35 U.S.C. §§ 112 and 103(a) and the arguments in support thereof, and request reconsideration and withdrawal of the rejections.

II. Claim Rejections Under 35 U.S.C. § 112, first paragraph

The Examiner has rejected claims 1-6, 14, and 17-21 under 35 U.S.C. § 112, first paragraph because the claims are allegedly too broad and are not included in the teachings of the specification. The specification is allegedly enabling for the use of melamine base resin, one reactant compound, and a fatty acid, but is not enabling for the use of *at least one* melamine base resin, *at least one* reactant compound and combinations thereof as claimed in claim 1 or *at least one* reactant compound further comprising a fatty acid, as in claim 3 because claim 3 requires the presence of *at least two* components, a melamine base resin, and *at least one* reactant compound, which comprises a cashew nut shell liquid, a fatty acid, and combination thereof (emphasis added).

Applicants respectfully traverse this rejection. In order to make an enablement rejection, the Examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention. *In re Wright*, 999 F.2d 1557, 1562 (Fed. Cir. 1993). Such reasonable basis includes the determination of what each claim recites and what the subject matter is when the claim is considered as a whole, not when its parts are analyzed individually. M.P.E.P. § 2164.08. The scope of the claims must only bear a reasonable correlation with the scope of enablement provided by the specification to persons of ordinary skill in the art. *In re Fisher*, 427 F.2d 833 (C.C.P.A. 1970).

Applicants submit that the claims, as amended, are enabled by the specification and bear a reasonable correlation with the scope of enablement provided by the specification to persons of ordinary skill in the art. The specification is enabled because it adequately describes to one of ordinary skill in the art how to make and use the invention and does not require undue or unreasonable experimentation to practice the invention. Throughout the specification there is ample support for the use of “at least one” melamine base resin and “at least one” reactant compound recited in the claims. Page 8, paragraph 20 of the specification teaches “. . . reaction products of a melamine base resin(s) and a reactant compound(s).” Page 9, paragraph 26 of the specification teaches that “. . . the selected melamine base resin or resins (*as a combination of resins may be used*) is reacted with a reactant compound that has a functional group that is a hydroxyl group, a carboxyl group, or a thiol group. The reactant compound may have only one of these functional groups, or it may have several of these functional groups, each of which may be the same as the others or different” (emphasis added). One of ordinary skill in the art would recognize based on the specification that the terms “melamine base resin(s)” and “reactant compound(s)” encompass the use of “at least one” of each of a melamine base resin and a reactant compound. Thus, there is adequate support in the specification as to how to use a melamine base resin(s) and reactant compound(s) to make the melamine co-polymer of the claimed invention and that combinations and multiple reactants may be used.

Regarding the phrase “and combinations thereof,” the specification teaches at page 2, paragraph 7 and page 4, paragraph 8 that the reactant compound contains a “functional group that is a carboxyl group, a hydroxyl group, and/or a thiol group, *or a combination of these groups*” (emphasis added). The specification also teaches at page 9, paragraph 26 of the specification, that the melamine base resin is reacted with a “reactant compound that has a functional group that is a hydroxyl group, a carboxyl group, or a thiol group. The reactant compound may have only one of these functional groups, *or it may have several of these functional groups*, each of which may be the same as the others or different.” (emphasis added). Page 9, paragraph 27 of the specification teaches that the reactant compound “contains *at least one* of the above-identified functional groups” (emphasis added). Thus, there is adequate support in the specification to enable one of ordinary skill in the art to make a co-polymer of the claimed invention by using reactant compounds that contain functional groups that are selected

from a group comprising a carboxyl group, hydroxyl group, and/or a thiol group, or a combination of these groups.

In light of these arguments, Applicants respectfully request that the Examiner withdraw this rejection.

III. Claim Rejections Under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-27 under 35 U.S.C. § 103(a) as being unpatentable over Chem Abstract 119:161751 ("Abstract 1") or 112:181468 ("Abstract 2") or 124:205109 ("Abstract 3") or 115:258415 ("Abstract 4") or 113:213128 ("Abstract 5"). The Examiner has maintained these rejections for the reasons stated in the Office Action of December 27, 2004. In that Office Action, the Examiner stated that Abstract 1 discloses melamine containing materials comprising melamine resins containing fatty acids, stearic acid melamine resins, or behenic acid melamine resins.

The Examiner has alleged that Abstract 2 discloses melamine formaldehyde oligomers comprising melamine resin modified with tall oil fatty acids, that are the reaction product of formaldehyde melamine copolymer with tall oil fatty acids or octadecadienoic acid, polymerized with hexakis (methoxymethyl)-1,3,5-triazine-2,4,6-triamine (melamine).

The Examiner takes the position that Abstract 3 discloses formaldehyde-melamine phthalic anhydride trimethylolpropane copolymer, esterized with soybean oil fatty acids, or formaldehyde polymerized with propanediol, isobenzofurandione and 1,3,5-triazine-2,4,6-triamine.

Abstract 4 is cited for disclosing benzenedicarboxylic acid polymerized with 2,2-dimethyl-1,3-propanediol, 2-ethyl-2(hydroxymethyl)-1,3-propanediol and hexanedioic acid, dodecanoate, polymerized with formaldehyde and 1,3,5-triamine.

Finally, the Examiner has alleged that Abstract 5 discloses 1,3,5-triazine-2,4,6-triamine, polymerized with cardanol.

The Examiner admits that the cited Abstracts do not disclose the melamine ring containing co-polymer of the claimed formula (I) or the use of specific catalysts, as in the claimed invention. The Examiner has alleged that the five cited Abstracts disclose the required reactants under the same or similar conditions. As a result, he argues that it would have been obvious to one of ordinary skill in the art to select the reactants under conditions from the references within the limitations of the instant claims since they have been shown to be effective

in similar systems, and such selections would have been expected to provide adequate results. The Examiner further argues that although the Abstracts do not disclose the melamine ring containing co-polymer of formula (I), the claimed formula (I) is very broad with many variations and therefore must be derived from the process, reactants, and derivatives of claim 14 because no mechanism has been established as to how to arrive at formula (I). The Examiner has also alleged that because all of the Abstracts allegedly disclose the reactants under process conditions of the claimed invention, the claimed product of formula (I) must therefore be considered inherent in the prior art, unless Applicants provide evidence to show that it is different, or has unexpected results.

Applicants respectfully traverse this rejection. There are three requirements that must be met in order to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 based on a single reference. First, there must be some suggestion or motivation in the prior art to modify the cited reference to achieve the invention. Second, the cited reference must suggest a reasonable expectation of success based on such modification. Finally, the prior art reference must teach or suggest all elements of the claim. The teaching or suggestion to modify the reference and the reasonable expectation of success must both be found in the prior art, and not based on the Applicants' disclosure. *See* M.P.E.P. §§ 2142-43 (August 2004). Further, inherency and obviousness are entirely different questions. That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is not known. *In re Spormann*, 363 F.2d 444, 448 (C.C.P.A. 1966).

When inherency is being properly asserted, for example, in a rejection under § 102, the initial burden in establishing inherency rests with the Examiner. In relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teaching of the applied art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). To establish inherency, the Examiner's evidence, which must be shown by other than conjecture, must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *In re Oelrich*, 666 F.2d 578, 581-82 (C.C.P.A. 1981).

Applicants respectfully submit that the Examiner has not set forth a *prima facie* case of obviousness of claims 1-27 over any of the five individually cited Abstracts. Therefore,

Applicants respectfully submit that none of the five cited Abstracts individually discloses or suggests the claimed structure, use, or formation thereof.

Abstract 1

Abstract 1 discloses a resin prepared from melamine and aqueous HCHO (formaldehyde) which is mixed with powdered pulp, stearic acid, titanium oxide, pigment, and other additives. Abstract 1 does not provide any motivation to one of ordinary skill in the art to modify, remove, substitute, or alter its reactants to produce the claimed invention. Nor does Abstract 1 provide any reasonable expectation of success because Abstract 1 discloses different reactants and products from the claimed invention which are specific to the melamine formaldehyde compound of Abstract 1.

One of ordinary skill in the art would not be motivated to produce the melamine co-polymer of the claimed invention by combining at least one melamine base resin of Abstract 1 and at least one reactant compound that has one or several functional groups such as a thiol group, as in the claimed invention because Abstract 1 does not teach or suggest making a melamine co-polymer by reacting a melamine base resin and a reactant compound. There is nothing in Abstract 1 that would lead one of ordinary skill in the art to randomly react the melamine formaldehyde resin of Abstract 1 with at least one reactant compound, such as that in the claimed invention, to produce the melamine co-polymer of the claimed invention.

Even if one of ordinary skill would have been motivated to attempt to produce the claimed invention by modifying any of the disclosed reactants in Abstract 1, any such modification would not produce the claimed invention because the claimed Abstract does not disclose the claimed structure of formula (I) either as a reactant or reactant product, cashew nut shell liquid ("CNSL"), or the reaction of CNSL with a melamine base resin. Hence, the reaction products produced in Abstract 1 will not produce products with the same properties as the claimed reaction product, which results from the reaction of CNSL and a melamine base resin. Applicants' reaction product is unobvious in view of Abstract 1 because the claimed co-polymer is produced using a reactant that contains CNSL, which has a unique chemical structure (a meta substituted alkenyl phenol). It is well known in the art that CNSL, which is a natural phenolic liquid, includes cardanol and cardol, neither of which are disclosed in Abstract 1. While the components of CNSL can incorporate some esters, unlike the reactants disclosed in Abstract 1, CNSL has the ability to react with unsaturated sites during processing, which confers upon the

claimed reaction product enhanced physical properties that the resins disclosed in Abstract 1 do not have.

Applicants further submit that new claims 28-31 would be patentable for the same reasons mentioned above, and further in view of the fact that the claimed cardanol-to-cardol ratios in the CNSL of those claims (80-100%/1-20% and 96-98%/2-4%) are also not disclosed in Abstract 1.

Abstract 2

Abstract 2 discloses the oxidative film formation of melamine formaldehyde oligomers. Abstract 2 does not teach a melamine co-polymer that is the reaction between a melamine base resin and a reactant compound with a functional group that is a carboxyl, hydroxyl, and/or thiol group, or any combination of these groups, as in the claimed invention. One of ordinary skill in the art would not be motivated to produce the melamine co-polymer of the claimed invention by combining at least one melamine base resin of Abstract 2 and at least one reactant compound that has one or several functional groups, such as in the claimed invention. There is nothing in Abstract 2 that would lead one of ordinary skill in the art to randomly react the melamine formaldehyde resin of Abstract 2 with at least one reactant compound as claimed, to produce the melamine co-polymer of the claimed invention.

Even if one of ordinary skill would have been motivated to attempt to produce the claimed invention by modifying any of the disclosed reactants in Abstract 2, any such modification would not produce the claimed invention because Abstract 2 does not disclose the claimed structure of formula (I) either as a reactant or reactant product, CNSL, or the reaction of CNSL with a melamine base resin. Hence, the reaction products produced in Abstract 2 will not produce products with the same properties as the claimed reaction product, which results from the reaction of CNSL and a melamine base resin. Applicants' reaction product is unobvious in view of Abstract 2 because the claimed co-polymer is produced using a reactant that contains CNSL, which has a unique chemical structure (a meta substituted alkenyl phenol). It is well known in the art that CNSL, which is a natural phenolic liquid, includes cardanol and cardol, neither of which are disclosed in Abstract 2. While the components of CNSL can incorporate some esters, unlike the reactants disclosed in Abstract 2, CNSL has the ability to react with unsaturated sites during processing, which confers upon the claimed reaction product enhanced physical properties that the resins disclosed in Abstract 2 do not have.

Applicants further submit that new claims 28-31 would be patentable for the same reasons mentioned above, and further in view of the fact that the claimed cardanol-to-cardol ratios in the CNSL of those claims (80-100%/1-20% and 96-98%/2-4%) are also not disclosed in Abstract 2.

Abstract 3

Abstract 3 discloses alkyd resin solutions for anticorrosive coatings that contain melamine resins and soybean-oil fatty acids and the reaction of low molecular weight esters with a melamine formaldehyde resin. Abstract 3 does not teach a melamine co-polymer that is the reaction between a melamine base resin and a reactant compound with a functional group that is a thiol group or any combination of the claimed functional groups. One of ordinary skill in the art would not be motivated to produce the melamine co-polymer of the claimed invention by combining at least one melamine resin of Abstract 3 and at least one reactant compound that has one or several functional groups, such as in the claimed invention. There is nothing in Abstract 3 that would lead one of ordinary skill in the art to randomly react the melamine resin of Abstract 3 with at least one reactant compound, such as that in the claimed invention, to produce the melamine co-polymer of the claimed invention.

Even if one of ordinary skill would have been motivated to attempt to produce the claimed invention by modifying any of the disclosed reactants in Abstract 3, any such modification would not produce the claimed invention because Abstract 3 does not disclose the claimed structure of formula (I) either as a reactant or reactant product, CNSL, or the reaction of CNSL with a melamine base resin. Hence, the reaction products produced in Abstract 3 will not produce products with the same properties as the claimed reaction product, which results from the reaction of CNSL and a melamine base resin. Applicants' reaction product is unobvious in view of Abstract 3 because the claimed co-polymer is produced using a reactant that contains CNSL, which has a unique chemical structure (a meta substituted alkenyl phenol). It is well known in the art that CNSL, which is a natural phenolic liquid, includes cardanol and cardol, neither of which are disclosed in Abstract 3. While the components of CNSL can incorporate some esters, unlike the reactants disclosed in Abstract 3, CNSL has the ability to react with unsaturated sites during processing, which confers upon the claimed reaction product enhanced physical properties that the resins disclosed in Abstract 3 do not have.

Applicants further submit that new claims 28-31 would be patentable for the same reasons mentioned above, and further in view of the fact that the claimed cardanol-to-cardol ratios in the CNSL of those claims (80-100%/1-20% and 96-98%/2-4%) are also not disclosed in Abstract 3.

Abstract 4

Abstract 4 discloses the modification of oligomeric melamine formaldehyde resin with tall oil compounds and the reaction of low molecular weight esters with a melamine formaldehyde resin. Abstract 4 does not teach a melamine co-polymer that is the reaction between a melamine resin and a reactant compound with a functional group that is a thiol group or any combination of the claimed functional groups. One of ordinary skill in the art would not be motivated to produce the melamine co-polymer of the claimed invention by combining at least one melamine base resin of Abstract 4 and at least one reactant compound that has one or several functional groups, such as in the claimed invention. There is nothing in Abstract 4 that would lead one of ordinary skill in the art to randomly react the melamine resin of Abstract 4 with at least one reactant compound, such as that in the claimed invention, to produce the melamine co-polymer of the claimed invention.

Even if one of ordinary skill would have been motivated to attempt to produce the claimed invention by modifying any of the disclosed reactants in Abstract 4, any such modification would not produce the claimed invention because the claimed Abstracts do not disclose the claimed structure of formula (I) either as a reactant or reactant product, CNSL, or the reaction of CNSL with a melamine base resin. Hence, the reaction products produced in Abstract 4 will not produce products with the same properties as the claimed reaction product, which results from the reaction of CNSL and a melamine base resin. Applicants' reaction product is unobvious in view of Abstracts 4 because the claimed co-polymer is produced using a reactant that contains CNSL, which has a unique chemical structure (a meta substituted alkenyl phenol). It is well known in the art that CNSL, which is a natural phenolic liquid, includes cardanol and cardol, neither of which are disclosed in Abstract 4. While the components of CNSL can incorporate some esters, unlike the reactants disclosed in Abstract 4, CNSL has the ability to react with unsaturated sites during processing, which confers upon the claimed reaction product enhanced physical properties that the resins disclosed in Abstract 4 does not have.

Applicants further submit that new claims 28-31 would be patentable for the same reasons mentioned above, and further in view of the fact that the claimed cardanol-to-cardol ratios in the CNSL of those claims (80-100%/1-20% and 96-98%/2-4%) are also not disclosed in Abstract 4.

Abstract 5

Abstract 5 discloses phosphorylated cardanol prepolymers that were obtained by simultaneous phosphorylation and oligomerization of a phosphorylated cardanol and an unsaturated pentadecylphenol extracted from the nuts of an *Anacardium occidentale*, also known as a cashew. One of ordinary skill would not likely be motivated to modify Abstract 5 to produce the claimed invention because of the difficulty and ambiguity involved in selecting, adding, or deleting the proper reactants and reaction conditions. Applicants submit that it would be difficult for one of ordinary skill in the art to determine the reaction process or product of Abstract 5 because the exact nature of the reaction is not disclosed. Furthermore, even if one of ordinary skill would have been motivated to attempt to produce the claimed invention by modifying any of the disclosed reactants in Abstract 5, any such modification would not produce the claimed invention because Abstract 5 does not disclose cardol, CNSL as a reactant, or a final co-polymer product of formula (I) of the claimed invention, or any other co-polymer structure. It is generally known in the art that amine groups, whether melamine, aliphatic, or aromatic amines, generally do not react directly with phenolic hydroxyls.

Applicants further submit that new claims 28-31 would be patentable for the same reasons mentioned above, and further in view of the fact that the claimed cardanol-to-cardol ratios in the CNSL of those claims (80-100%/1-20% and 96-98%/2-4%) are also not disclosed or suggested in Abstract 5.

None of Abstracts 1-5 provide any motivation to one of ordinary skill in the art to modify, remove, substitute, or alter its reactants to produce the claimed invention. Nor do any of the Abstracts provide any reasonable expectation of success of producing the claimed invention because each of the reactions of the five cited Abstracts are very different from the claimed invention. Each reference discloses products that are produced by different reactants compared to each other and is specific to such resulting compounds.

The cardol/cardanol ratio of the CNSL reactant used to make the claimed melamine ring-containing co-polymer contributes to the unobviousness and unexpected results of the claimed melamine polymer in view of the prior art.

Further, including cardol, as well as in the preferred embodiment, the particular level of cardol present in the reaction is crucial for producing gelled batches of the claimed melamine co-polymer of the proper viscosity (*See* Examples 2 and 3 in the specification).

The melamine ring-containing co-polymer of the claimed invention is an improvement because the method of combining the melamine resin with CNSL causes the melamine ring-containing co-polymer to be prepared in less than half the time and at a lower process temperature compared to the manufacture of conventional synthetic resins, which leads to reduced manufacturing and energy costs relative to the production of other melamine ring-containing polymers described in the art (*See* paragraph 60 of the specification). The CNSL used to produce the claimed invention contributes to the nonobviousness of the claimed invention over the prior art because the CNSL is capable of polymerizing “through” the unsaturated sites found on the cardol/cardanol chain (*See* paragraph 68 of the specification). The co-polymer of the claimed invention also provides good chemical resistance, film hardness, improved gloss, tack, adhesion, good water resistance, and excellent methyl ethyl ketone (MEK) resistance generally not present with the reaction products of aliphatic fatty acids and melamine formaldehyde (*See* page 5, paragraph 13 and page 15, paragraph 54 of the specification).

Even if inherency were being properly raised in a § 103 rejection, which it is not, formula (I) of the claimed invention is not inherent in the prior art. The Examiner has not provided a basis in fact and/or technical reasoning that reasonably supports this determination that the allegedly inherent characteristics of the claimed formula (I) or its reactants necessarily flow from the teaching of the applied art other than complete speculation.

For the above-mentioned reasons Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to select the reactants as claimed under the conditions of any of the five Abstracts cited. First, none of the Abstracts cited by the Examiner discloses all of the reactants under the identical reaction conditions of the claimed invention. The reactant, product, and reaction combinations disclosed in each of the Abstracts are different from each other, as well as from the claimed invention. Second, and in further view thereof, it would be prohibitively difficult and cumbersome for one of ordinary skill in the art to randomly

select the proper combination of reactants and reaction conditions from any one of the Abstracts to produce the claimed product, without any guidance as to which reactants or reaction conditions in combination would have the greatest likelihood of producing the claimed invention particularly without information on the role or content of cardol in the CNSL. There are too many factors to consider such as compatibility, reactivity, interactions of functional groups, reaction kinetics, and potential catalysts, that would need to be evaluated to determine how the given compounds in the various Abstracts would react, if at all. Therefore, Applicants submit that the Examiner's broad rejection concerning the proposed reactants and methods of claims 1-27 has not established a reasonable expectation of success of producing the claimed invention for any of the five cited Abstracts. Applicants further submit that the claimed product of formula (I) is not inherent in the prior art because the Examiner has not proven that the missing descriptive matter, i.e., the melamine ring-containing co-polymer produced using CNSL, is present in any of the cited Abstracts or would necessarily flow from the limited teaching thereof.

In summary, Applicants respectfully submit that, in light of the above-mentioned arguments, independent claims 1, 7, 14, 22, and 23 are not *prima facie* obvious over any of the cited Abstracts, and one of ordinary skill in the art would not be motivated to successfully produce the claimed invention by modifying, removing, substituting, or combining any of the reactants or reaction conditions in each of the cited Abstracts. Applicants also remind the Examiner that if an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1072 (Fed. Cir. 1988). Thus, Applicants submit that because claims 1, 7, 14, 22, and 23 are nonobvious in view of the prior art, all dependent claims 2-6, 8-13, 15-21, and 24-27 therefrom would also be nonobvious.

IV. Conclusion

In view of the foregoing, applicant submits that claims 1-27 fully comply with §§ 112, first paragraph and 103(a) and are patentable over the references cited by the Examiner in support of rejection. Withdrawal of the rejection and a Notice of Allowance are respectfully requested.

Respectfully submitted,

Gregory P. Tzap et al.

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(Date)

By:

Tara L. Custer
Tara L. Custer

Registration No. 51,019

FLASTER/GREENBERG P.C.

Commerce Center

1810 Chapel Avenue West

Cherry Hill, NJ 08002

Telephone: (856) 661-1900

Direct Dial: (856) 382-2204

Facsimile: (856) 661-1919

E-Mail: tara.custer@flastergreenberg.com

LLC:TLC

Enclosures: Petition for extension of time of two months